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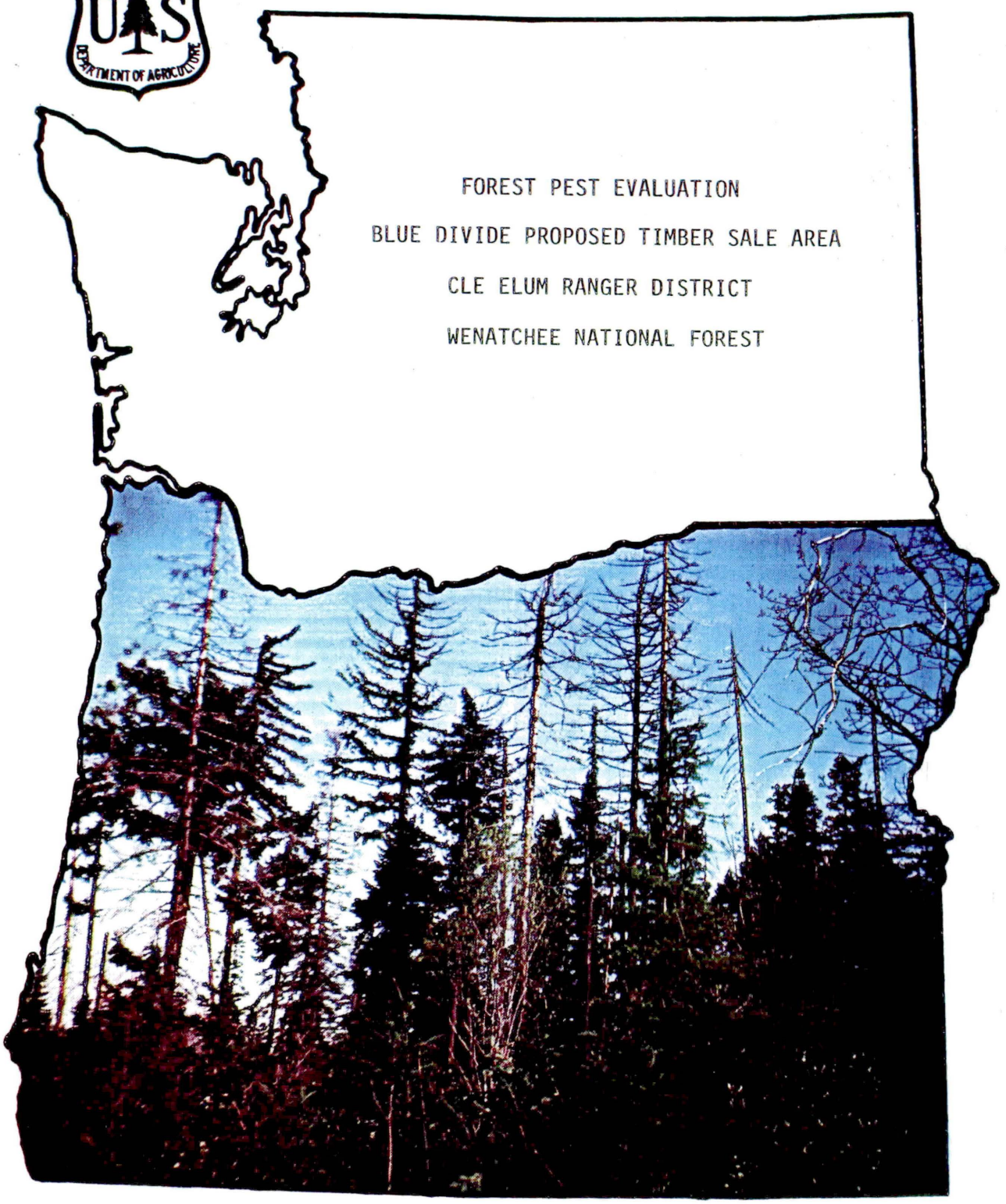
Forest Pest Management
Pacific Northwest Region

FOREST PEST EVALUATION

BLUE DIVIDE PROPOSED TIMBER SALE AREA

CLE ELUM RANGER DISTRICT

WENATCHEE NATIONAL FOREST



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CLE ELUM RANGER DISTRICT
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by

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INTRODUCTION

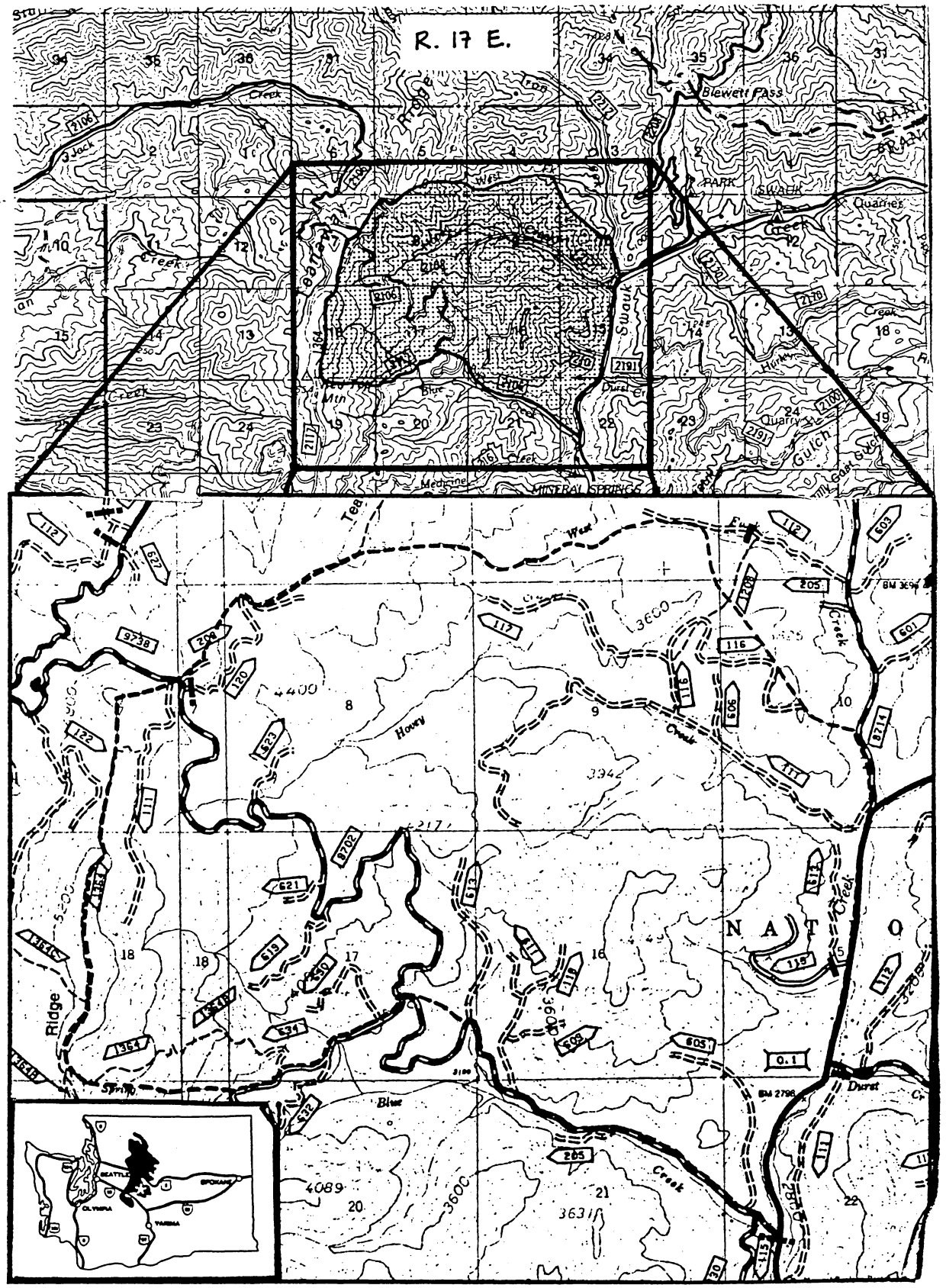
In September and October of 1986, Forest Pest Management pathologists surveyed timber stands in the Blue Divide Proposed Timber Sale Area (T. 21 N., R. 17 E., secs. 7, 8, 9, 10, 15, 16, 17, 18, 19, 21, 22). The proposed Sale Area lies in the Swauk Corridor along US Highway 97 and consists of approximately 2600 acres of eastside Washington mixed conifer type (Figure 1). From field reconnaissance and recent stand examination, District silviculturists identified the area as one severely impacted by root diseases and dwarf mistletoes. To avoid the prescription of silvicultural treatments that would perpetuate rather than ameliorate pest management problems, District Silviculturist Rob Mrowka requested a pest management evaluation of the entire Sale Area. The objectives for the evaluation were to: 1) identify and determine the relative severity of specific insect and disease problems in each stand, and 2) develop management recommendations that would minimize current and future losses. Pest management recommendations will be considered in the development of stand treatment alternatives in the environmental assessment (EA) for the Blue Divide Timber Sale. This sale is scheduled to be sold in 1991.

SALE AREA DESCRIPTION

The Sale Area is characterized by wide variety in stand structure, size and age class distribution, habitat type, timber type, elevation, and aspect. Elevations range from 3000-5200 feet. Topography is moderate to steep, with slopes ranging from 20-75 percent; gentle slopes occur on the numerous benches and saddles. Tree species include Douglas-fir, ponderosa pine, grand fir, lodgepole pine, subalpine fir, Engelmann spruce, mountain hemlock, western larch, and western white pine.

The Blue Divide area lies directly east of Teanaway Ridge, is bounded to the west by U.S. Highway 97, to the south by Blue Creek, and to the north by the West Fork of Iron Creek. All age and size classes are represented, and nearly all stands have been entered. Most stands have been partial cut at least once; many have been highgraded three or more times. Regeneration and overstory removal cuts are conspicuously lacking. Partial cut entries date as far back as the turn of the century, though most partial cutting has been more recent. Oldest entries were for ponderosa pine; in more recent entries, all species were taken.

Figure 1. Area Map of the Blue Divide Proposed Timber Sale, Cle Elum Ranger District, Wenatchee NF



There are two major adverse consequences of past cutting methods:

1) A strong successional trend in many stands towards a more shade-tolerant, root disease-susceptible climax vegetation, and

2) exascerbation of the dwarf mistletoe problem through the perpetuation of uneven-aged stands by partial cut or selection cut entries.

METHODS

Stands in the proposed Sale Area were delineated by District silviculture personnel and examined by a stand exam crew prior to our survey. Stand boundaries were delimited on 1:12000 scale resource aerial photography (1984). Maps showing the location of individual stands within the proposed Sale Area are not included in this report. This information is recorded on aerial photos and photo overlays at the Cle Elum Ranger District.

We surveyed 87 of 91 stands in the proposed Sale Area; Stands 260, 269, 270, and 271 were not surveyed due to time constraints. Stands were inspected with a walk-through examination. Walk-through transects were often concurrent with flag lines placed by the stand exam crew. A portion of each stand deemed representative was reconnoitered since it was infeasible to inspect all areas. Each stand was inspected for evidence of insect and disease damage, and each occurrence of damage was sketched onto a field map and the damage severity noted. In addition to evaluating pest damages and pest management opportunities, we characterized stand structure, size and age class distribution, habitat type and successional stage, fire history, cutting history and type of past entry, and previous stand condition. Once a stand was surveyed, we assessed overall stand health and vigor and the implication of pest damages to future stand management. Stands were assigned a silviculture and a pest management treatment priority and a brief silviculture diagnosis was given.

Nonstocked or understocked portions of stands were scrutinized for evidence of root disease. Common indications of root disease were root balls on dead windthrown trees, the presence of old stubs (snags < 20 feet tall), recently killed standing trees, and live trees with chlorotic and thinning crowns. Dead trees, and live trees with symptoms of root disease were carefully examined to identify pathogenic root disease fungi. This involved:

1) Removing a section of bark from the boles of dead trees to observe any bark beetles or their galleries and,

2) removing a section of bark from at least two sides of the root collar and exposing and dissecting portions of at least two major roots, to observe stained or decayed wood, or mycelium (ectotrophic or subcortical fans) of root disease fungi.

Damage severity was qualitatively rated for each pest, in each tree species, at one of five levels:

very low (VL) - indicated incidental and insignificant damage and the specified pest problem should be given minimal attention when considering stand management alternatives and selecting silvicultural systems to accomplish them.

low (L) - indicated that damage was minor but measurable, losses were acceptable, the specified pest problem is readily controlled within the framework of the preferred silvicultural system with minor adaptation to the prescription to achieve effective control.

moderate (M) - indicated that damage severity was intermediate between low and high, losses were at the breakpoint of acceptability, the specified pest problem should exert some influence on the silvicultural system that is selected, and the prescription should reflect moderate adaptation to achieve effective control.

high (H) - indicated that damage to the stand was significant and increasing, losses were unacceptable, the specified pest problem should exert a major influence on the silvicultural system that is selected, and the prescription should reflect major adaptation to achieve effective control.

severe (S) - indicated that damage and loss were extreme and completely unacceptable, the specified pest problem should dictate the silvicultural system that is selected, and the principal emphasis of the prescription is the achievement of effective control with sound silviculture.

RESULTS AND DISCUSSION

A stand description, insect and disease summary, and management recommendations are given for each stand at the end of this section. Insect and disease conditions are summarized for each stand in Table 1. Table 2 summarizes recommended silviculture by harvest activity and gives silviculture and pest management treatment priorities.

Throughout the Blue Divide Proposed Timber Sale Area, root disease and dwarf mistletoe damages are the most severe. Mistletoe stands with the highest treatment priority are:

1) Those with an infected mature overstory and an adequately stocked, healthy or lightly infected understory. In these stands, removal cuts are recommended.

Other treatment priorities in decreasing order are:

2) Multi-storied or two-storied infected stands where removal of all or most of the severely infected trees would result in a fully or near-fully stocked even-aged, lightly infected stand. In these stands, removal and intermediate cuts (commercial and sanitation thinning) are recommended.

3) Poletimber or sawtimber stands that are severely infected and inadequately stocked. Regeneration cuts are recommended.

4) Even-aged or nearly even-aged, adequately stocked, stands of poletimber to immature sawtimber, that are lightly to moderately infected, and where mistletoe can be controlled by intermediate cuts. Commercial or sanitation thinnings are recommended.

5) Even-aged stands near rotation age with moderate to light infection levels, and sanitation of the mistletoe can be deferred until regeneration. Regeneration cuts are recommended.

A similar system for identifying treatment priorities in root-diseased stands is unavailable and is perhaps inappropriate. In general, treatment priority is closely linked with damage severity.

Sections on pest biology, pest identification, and general management recommendations are not included in this report. These subjects are given excellent treatment in the following Forest Pest Management publications and are available upon request:

1) Forest Disease Management Notes
2) Laminated Root Rot - A Guide for Reducing and Preventing Losses in Oregon and Washington Forests
3) Root Diseases in Oregon and Washington Conifers

Table 1. Forest pest incidence and damage severity in surveyed timber stands in the Blue Divide Proposed Timber Sale Area, Cle Elum RD, Wenatchee NF

	PATHOGENS									INSECTS		
Stand No.	PHWE	FOAN	AROB	CRRI	ARLA	ARDO	ARCA	ARTS	*	DEPO	DEPS	SCVE
193	L	VL	L	M	M	M		M		VL		VL
194	H	L	L	M	M	M	L	L				L
195	L	L	L		M	H		M				
196	L	L			M	M						
197		L	VL	M	M	M						
198	L		L	M	M	M						
199	L			M	M	M						L
200	H	L		S		S						M
201					H							
202	VL	VL		M	VL	L						
203		VL		M	L	L						
204	VL				VL	VL						
205	L				H	H						L
206	L			M	L	M						
207	L	M		M	M	M						L
208	VL	VL		M	VL							
209	L	L		M	M	M						
210	M	M		H	M	L						L
211	M	VL		M	M							VL
212	M	M		H	VL	L						M
213				M								
214	M	L		H	L	VL						L
215	L		M	H	M							M
216	L	VL		H	L	VL						
217										VL		
218		L		H	L							
219										M		
220	S	L		M	L	L					VL	L
221	M	L	L	H	L	L						L
222	M	M			M							M

ABBREVIATIONS:
PHWE: Laminated root rot, caused by Phellinus weirii
FOAN: Annosus root disease, caused by Fomes annosus
AROB: Armillaria root disease, caused by Armillaria obscura
CRRI: White pine blister rust, caused by Cronartium ribicola
ARLA: Larch dwarf mistletoe - Arceuthobium laricis
ARDO: Douglas-fir dwarf mistletoe - A. douglasii
ARCA: Western dwarf mistletoe - A. campylopodum
ARTS: Hemlock dwarf mistletoe - A. tsugense (also infects true fir)
DEPO: Mountain pine beetle - Dendroctonus ponderosae
DEPS: Douglas-fir beetle - D. pseudotsugae
SCVE: Fir engraver beetle - Scolytus ventralis

PEST DAMAGE SEVERITY IS: Very Low - VL, Low - L, Moderate - M, High - H, Severe - S

Table 1 (continued). Forest pest incidence and damage severity in surveyed timber stands in the Blue Divide Proposed Timber Sale Area Cle Elum RD, Wenatchee NF

	PATHOGENS								*	INSECTS		
Stand No.	PHWE	FOAN	AROB	CRRI	ARLA	ARDO	ARCA	ARTS		DEPO	DEPS	SCVE
223	L	M		H	L	L						L
224	M	L			VL	VL						L
225	M	M	L	M	L	M				M		H
226			L	M	M	M						L
227		M		M	L	L						L
228		H	L	M	M	L				M		L
229					H							
230	L				L	L					L	L
231			L	M	M	L				VL		
232			VL	M	VL	L						
233			M	M	L	H						
234	L	VL	VL		L	L						L
235					L	L						
236	M	L	L	H	L							L
237			L	M	L	L						
238	H	VL	L	H	M							L
239	L	L	L	H	M	M				VL		
240	M	L	L	L	M	L						L
241	L	VL	L	L	M	L	VL					
242	S	L		H	L						M	H
243	L	VL	VL	H	M	L				L		
244	H		L	H	L	M						L
245	L			M	M	M		L				
246	M		L	M	M	VL				L		
247	H	L	VL	M	M	M						M
248	H				M	M				L		
249	M	L	L		L	M	M				L	L
250		L				H	L					
251			M			M						

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Table 1 (continued). Forest pest incidence and damage severity in surveyed timber stands in the Blue Divide Proposed Timber Sale Area, Cle Elum RD, Wenatchee NF

	PATHOGENS								INSECTS		
Stand No.	PHWE	FOAN	AROB	CRRI	ARLA	ARDO	ARCA	ARTS *	DEPO	DEPS	SCVE
252		L				L					
253	M				M	L					L
254			L				M				L
255						S	S				
256						VL	VL				
257						M	H				
258						M	M				
259		L				M	L				
261	M		L			S	M				
262						L	M				
263						M	L				
264	L	M	M		L	L					L
265	L	L	L		M	M	M				
266			M			M	M				L
267	L	L	L	H	M	H	H				VL
268			L			M	M				
272	L	L	L			VL					L
273		L				VL					VL
274		L				L				VL	VL
275				H		M					
276						M					
277	M	L	VL	M	M	L			VL		L
278	L			L	M	L			L		
279	L				L				L		
280	M	L									L
281	L	M	L			M			H		L
282	L	M			M	M			L		
283		L							VL		

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PEST DAMAGE SEVERITY IS: Very Low - VL, Low - L, Moderate - M, High - H, Severe - S

Table 2. Silviculture summary and treatment priorities for timber stands in the Blue Divide Proposed Timber Sale Area, Cle Elum RD, Wenatchee NF

	HARVEST ACTIVITY				TREATMENT PRIORITY	
	Regeneration	Intermediate	Removal	No Entry	Silviculture	Pest Mgt.
Stand No.						
193				DEFER	2	2
194	HSH or HCR				5	5
195	HSH				3	4
196		HSA U/S	HOR		3	2
197		HTH U/S	HOR		3	2
198		HSA U/S			3	3
199		HSA U/S			3	3
200	HCC				5	5
201				DEFER	2	2
202				DEFER	1	1
203			HOR		4	2
204		SPC SW 1/3		DEFER NE 2/3	2	1
205	HSH W1/2	HSA U/S E1/2	HOR E1/2		5	5
206		HTH U/S	HOR		2	4
207		HTH U/S	HOR		4	4
208				DEFER	1	1
209		SPC U/S	HOR		5	5
210		HTH U/S	HOR		3	3
211		HTH			4	4
212		HTH			3	4
213		HTH			1	1
214		HTH			2	3
215	HCC or HCR				5	4
216		HTH			2	1
217		HTH			4	3
218		HTH			4	2
219	HSH				5	5
220	HCC				5	5
221	HCC				4	4
222	HCC SE1/2				5	5
	HSH NW1/2				4	4

ABBREVIATIONS:

HCC-Clearcut
HCR-Clearcut with seed trees reserved
HOR-Overstory removal cut
HSA-Sanitation thinning
HSH-Shelterwood seed cut
HTH-Commercial thinning
U/S-Understory

N-North
S-South
E-East
W-West
NW-Northwest
NE-Northeast
SW-Southwest
SE-Southeast

Table 2 (continued). Silviculture summary and treatment priorities for timber stands in the Blue Divide Proposed Timber Sale Area, Cle Elum RD, Wenatchee NF

	HARVEST ACTIVITY				TREATMENT PRIORITY	
	Regeneration	Intermediate	Removal	No Entry	Silviculture	Pest Mgt.
Stand No.						
223	HCC N1/2				3	4
		HTH U/S	HOR S1/2		3	5
224	HSH or HCR				3	2
225	HCC				5	5
226	HCC MID1/3				5	4
				DEFER N1/3,S1/3	1	3
227	HCC				5	2
228	HCR or HCC				5	5
229		HSA			4	3
230		HTH			3	3
231				DEFER	2	3
232		SPC		DEFER	2	1
233			HOR		2	5
234				DEFER	3	3
235				DEFER	2	1
236				DEFER	3	3
237		HTH			4	3
238				DEFER	2	5
239		HTH			5	4
240		HTH			4	5
241		HTH			4	3
242				DEFER	2	5
243		HTH U/S	HOR		4	3
244	HCC				3	5
245		HTH U/S	HOR		2	1
246		HTH			4	2
247		HTH			5	5
248		HTH			4	5
249	HSH			DEFER	2	3
250	HSH			DEFER	2	3
251		HSA			2	3

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N-North
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NE-Northeast
SW-Southwest
SE-Southeast

Table 2 (continued). Silviculture summary and treatment priorities for timber stands in the Blue Divide Proposed Timber Sale Area, Cle Elum RD, Wenatchee NF

	HARVEST ACTIVITY				TREATMENT PRIORITY	
	Regeneration	Intermediate	Removal	No Entry	Silviculture	Pest Mgt.
Stand No.						
252				DEFER	1	1
253				DEFER	1	2
254				DEFER NE2/3	2	1
		HSA U/S SW1/3	HOR SW1/3		3	4
255		HSA U/S	HOR		2	4
256				DEFER	1	1
257		HSA U/S	HOR		4	5
258		HSA W1/3	HOR W1/3	DEFER E2/3	2	3
259				DEFER	1	3
261		HSA S1/2			1	2
	HSH or HCR N1/2				4	5
262				DEFER	2	4
263		HSA U/S	HOR		2	4
264		HTH U/S	HOR		3	4
265		HTH			4	4
266		HTH U/S	HOR		4	5
267	HSH			DEFER	5	5
268	HSH				3	5
272				DEFER	1	1
273				DEFER	2	2
274		HTH			3	3
275		HSA U/S SW1/3	HOR SW1/3		3	2
		HSA U/S NE1/4	HOR NE1/4		3	2
				DEFER	2	2
276		HTH U/S	HOR		4	3
277		HTH			3	3
278				DEFER	1	1
279				DEFER	2	1
280	HCC				2	3
281	HCC				5	2
282	HCC				5	2
283				NO ENTRY	1	1

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HCC-Clearcut
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HSH-Shelterwood seed cut
HTH-Commercial thinning
U/S-Understory

N-North
S-South
E-East
W-West
NW-Northwest
NE-Northeast
SW-Southwest
SE-Southeast

STAND NUMBER - Blue Divide 193

Current Stand Description: All age and size classes are represented.

Overstory: Light scattered stocking of mature sawtimber ponderosa pine (PIPO)

Understory: Seedling and sapling grand fir (ABGR), Douglas-fir (PSME), lodgepole pine (PICO), and PIPO. Poletimber to immature sawtimber ABGR, PSME, western larch (LAOC). Here and following vegetation is listed in order of decreasing abundance.

Insect and Disease Summary: Dwarf mistletoe severity is moderate in PSME, ABGR, LAOC; ABGR is infected with the western hemlock dwarf mistletoe. The site is regenerating to ABGR. Laminated root rot, Armillaria and Annosus root disease problems that are currently low in severity will likely increase. White pine blister rust hazard is moderate.

Management Recommendations: Defer treatment for 10-20 years, allowing the current immature sawtimber and poletimber stand to mature. After 20 years commercially thin (HTH), discriminating against ABGR and PSME in laminated root rot and Annosus root disease centers featuring PIPO, LAOC and PSME. Leave tree dwarf mistletoe rating (DMR) should be less than 3 and confined to the lower third of the crown (DMR < 3, lower 1/3 of crowns).

STAND NUMBER - Blue Divide 194

Current Stand Description: All age and size classes are represented.

Overstory: Scattered mature sawtimber PIPO, PSME, and LAOC.

Understory: Seedling and sapling PIPO, ABGR, PSME, and PICO. Poletimber to immature sawtimber PSME, ABGR, and LAOC.

Insect and Disease Summary: Pest management concerns center around the dwarf mistletoe infected-scattered overstory and high damage severity associated with laminated root rot. The previous stand was stocked with species normally considered low risk to root disease. The current stand is highly susceptible to root disease and future losses may be substantial. The successional trend towards a more root disease-susceptible climax vegetation is the key negative result of selective harvesting (partial cutting).

Management Recommendations: Regeneration cut by shelterwood (HSH) or seed tree (HCR) harvest methods. Leave PIPO : PSME (2:1), final removal cut (HFR) after 5 years, fill in plant PIPO, PSME, LAOC. Seed tree DMR < 3. This stand has the highest treatment priority.

STAND NUMBER - Blue Divide 195

Current Stand Description: 3-storied.

Overstory: Mature sawtimber PIPO with a few scattered PSME.

Understory: Poletimber to immature sawtimber PSME, ABGR, few LAOC. Sapling PSME, ABGR, and PIPO. The understory stocking is predominantly PSME and ABGR.

Insect and Disease Summary: Douglas-fir dwarf mistletoe severity is very high to severe east of the 9714116 Road and low to moderate west of the road. Larch and hemlock mistletoe severity are moderate to high east of the road and low west of the road. Armillaria root disease incidence is low in ABGR.

Management Recommendations: Regenerate the stand by HSH within the next 10 years leaving as many PIPO seed trees as possible. Select PSME seed trees with DMR < 3. HFR within 5 years, with fill-in planting of PIPO, PSME, and LAOC. Employ frequent underburning to destroy ABGR ingrowth.

STAND NUMBER - Blue Divide 196

Current Stand Description: 2-storied.

Overstory: Scattered sawtimber to mature sawtimber PIPO, PSME.

Understory: Sapling to poletimber PIPO, PSME, and ABGR. Much of the understory is inadequately stocked.

Insect and Disease Summary: LAOC and PSME mistletoe severities are moderate. Laminated root rot and Annosus root disease were observed at low severity levels.

Management Recommendations: We recommend an overstory removal (HOR) which may be easily deferred for up to 10 years; sanitation thinning (HSA) in the understory. Leave tree DMR < 3, lower 1/3 of crowns. Discriminate against ABGR and PSME in the laminated root rot pockets and ABGR in Annosus root disease pockets. Provide adequate buffering around root disease centers equivalent to two normal tree spacings.

STAND NUMBER - Blue Divide 197

Current Stand Description: 2-storied.

Overstory: Sawtimber PIPO, PICO with scattered PSME and LAOC.

Understory: Full stocking of sapling to poletimber PICO, PIPO, PSME, and ABGR. Scattered western white pine (PIMO) reproduction was also observed.

Insect and Disease Summary: Dwarf mistletoe is moderate in PSME and LAOC. The most significant management concern is mistletoe infection in the overstory. Some PIPO saplings are infected with Armillaria root disease, but damage is minimal. Annosus root disease severity in ABGR is low; several mature PIPO in the draw have Elytroderma needle blight, and white pine blister rust hazard is moderate.

Management Recommendations: We recommend HOR to release the healthy understory, and HTH of the residual understory poletimber and immature sawtimber. Discriminate against ABGR whenever possible, especially as laminated root rot or Annosus root disease infection centers are encountered. PICO pockets are overstocked and susceptible to mountain pine beetle attack and should be thinned or cut out. Understory leave tree DMR < 3 in the lower third of crowns.

STAND NUMBER - Blue Divide 198

Current Stand Description: 2-storied.

Overstory: Poletimber to immature sawtimber ABGR, PSME, PICO, PIPO, and a few scattered PIMO.

Understory: Seedling and sapling ABGR and PSME.

Insect and Disease Summary: Recent HOR removed the most important mistletoe hazard with the removal of the overstory. LAOC and PSME dwarf mistletoe continue to be moderate in the understory. Laminated root rot severity is low in PSME; Armillaria root disease severity is low in ABGR. White pine blister rust hazard is moderate.

Management Recommendations: We recommend a HSA in the understory; leave tree DMR < 3, lower 1/3 of crowns. The stand is generally unthrifty and release is questionable. Leave trees should have a low DMR, good live crown ratio, and should be the most vigorous trees. Treatment can be deferred for up to 10 years. We recommend that the rotation be shortened until such time as crop tree average diameter is 12-14 inches. Regenerate to PICO, LAOC.

STAND NUMBER - Blue Divide 199

Current Stand Description: Same as Stand 198 above.

Overstory: Same as Stand 198 above.

Understory: Same as Stand 198 above.

Insect and Disease Summary: The same as Stand 198, with the exception that Armillaria root disease was not found in ABGR.

Management Recommendations: See Stand 198 above.

STAND NUMBER - Blue Divide 200

Current Stand Description: 3-storied.

Overstory: Sawtimber to mature sawtimber PIPO, LAOC, PIMO.

Understory: Poletimber to immature sawtimber ABGR, LAOC, PSME, PIMO; seedling and sapling ABGR, PSME.

Insect and Disease Summary: PIMO is severely infected with white pine blister rust; laminated root rot damage severity is high in PSME and ABGR, and mistletoe damage in PSME is severe. ABGR with laminated root rot are attacked by the fir engraver beetle. Pest damages are severe throughout the stand.

Management Recommendations: Regenerate the stand by HCC, plant back to LAOC, PIPO, PSME, PIMO. PIPO should be featured near the top of the unit, LAOC near the bottom. Avoid planting old laminated root rot centers to PSME. Discriminate against PSME and ABGR in old laminated root rot centers at each subsequent entry for the length of the rotation. If PIMO is planted, use stock with demonstrated genotypic resistance to blister rust. This stand has the highest treatment priority.

STAND NUMBER - Blue Divide 201

Current Stand Description: Single-story.

Overstory: Poletimber to immature sawtimber LAOC, PSME, PICO, ABGR.

Insect and Disease Summary: LAOC mistletoe severity is high in the northwest and southwest portions of the stand. Most of the mortality in LAOC that will occur has already occurred. PSME in the middle portion is healthy.

Management Recommendations: Defer treatment for 20 years. The current stand is adequately stocked, and crop trees are putting on acceptable radial growth. Consider HTH in 20 years, featuring LAOC, PSME.

STAND NUMBER - Blue Divide 202

Current Stand Description: Stand consists of two potential units.

Overstory: The northeast 1/3 of the stand is poletimber to immature sawtimber LAOC, PSME, ABGR. The southwest 2/3 of the stand is sapling to poletimber LAOC, PSME, ABGR, PICO, PIMO.

Insect and Disease Summary: Pest management considerations are minimal for this stand.

Management Recommendations: We recommend no treatment at this time. In 10 years, HTH the northeast 1/3; HTH the southwest 2/3 in 20 years.

STAND NUMBER - Blue Divide 203

Current Stand Description: 2-storied.

Overstory: Sawtimber to mature sawtimber PSME, ABGR, LAOC.

Understory: Poletimber to immature sawtimber ABGR, LAOC, PSME, PICO, PIMO.

Insect and Disease Summary: Mistletoe severity is low in LAOC and PSME overstory. Blister rust hazard is moderate.

Management Recommendations: HOR and blend poletimber and immature sawtimber with that of the adjacent Stand 202.

STAND NUMBER - Blue Divide 204

Current Stand Description: Even-aged reproduction.

Overstory: Sapling PSME with scattered PICO, LAOC, and ABGR ingrowth.

Insect and Disease Summary: There are no major pest management problems.

Management Recommendations: Fill-in plant the northeast 2/3 of the unit with LAOC, PSME. Precommercial thin (SPC) the southwest 1/3. HTH in 15-20 years featuring PSME, LAOC.

STAND NUMBER - Blue Divide 205

Current Stand Description: All age and size classes are represented.

Overstory: Scattered stocking of sawtimber to mature sawtimber LAOC, PSME, and PIPO with few ABGR.

Understory: Poletimber to immature sawtimber LAOC, PSME, PIPO, and ABGR.

Insect and Disease Summary: Mistletoe infection severity is high in the overstory LAOC and PSME and low in the understory. Minor laminated root rot was found in ABGR reproduction. This stand has the highest treatment priority.

Management Recommendations: HOR the eastern 1/2 of the stand, HSA the mistletoe infected LAOC and PSME understory; leave tree DMR < 3, lower third of crowns. HSH the western 1/2 of the stand, feature LAOC.

STAND NUMBER - Blue Divide 206

Current Stand Description: All age and size classes are represented.

Overstory: A few scattered overmature sawtimber PSME. Most of the overstory is large poletimber to sawtimber PSME, ABGR, LAOC, PICO. PSME and ABGR dominate the north side of the creek; LAOC, PICO, and ABGR the south side of the creek.

Understory: ABGR saplings and small poletimber.

Insect and Disease Summary: Laminated root rot severity is low in PSME and ABGR. Most of the scattered overmature PSME are quite severely mistletoe infected; understory poletimber and sawtimber are moderately damaged. LAOC is also mistletoe infected, but at low levels. Blister rust hazard is moderate.

Management Recommendations: HOR, removing mistletoe infected PSME. HTH the understory from below, retaining PICO and LAOC, especially in laminated root rot centers. Regenerate by HCC or HSH in 40-50 years. Earlier regeneration to LAOC by HSH or HCR methods could be adequately accomplished within 20 years. Silviculture treatment priority is low to moderate, pest management treatment priority is moderate to high.

STAND NUMBER - Blue Divide 207

Current Stand Description: 3-storied.

Overstory: Mature sawtimber LAOC and PSME, with a few sawtimber ABGR and subalpine fir (ABLA).

Understory: Immature sawtimber to sawtimber LAOC, PSME, ABGR, ABLA with scattered PICO and PIMO. Large sapling to poletimber ABGR and PICO.

Insect and Disease Summary: Annosus root disease severity is moderate in ABGR and low in ABLA. Laminated root rot severity is low in ABGR and PSME and very low in ABLA. Mistletoe is moderate in LAOC and PSME. Brown cubical butt rot (Phaeolus schweinitzii) severity was low in mature and overmature PSME, and several mature sawtimber ABGR were severely infected with the Indian paint fungus (Echinodontium tinctorium). Blister rust hazard was moderate. Root-diseased ABGR were attacked by the fir engraver beetle.

Management Recommendations: HOR the mature sawtimber overstory; HTH the understory from below. Leave LAOC, PICO, and PIMO in the laminated root rot and Annosus root disease centers; leave tree DMR < 3, lower third of crowns.

STAND NUMBER - Blue Divide 208

Current Stand Description: Plantation.

Overstory: Very few scattered mature sawtimber PSME and LAOC in the south end of the stand.

Understory: Sapling PSME with a few scattered LAOC, ABGR, PICO and PIMO ingrowth.

Insect and Disease Summary: Root diseases are incidental in PSME and ABGR as is the mistletoe in the scattered residual LAOC and PSME sawtimber at the south end of the unit.

Management Recommendations: Remove or girdle the mistletoe infected sawtimber at the bottom of the unit. We recommend no other treatment at this time. HTH in 20 years.

STAND NUMBER - Blue Divide 209

Current Stand Description: Plantation.

Overstory: Scattered residuals from previous removal cut include poletimber to sawtimber LAOC, PSME, ABGR.

Understory: Sapling LAOC:ABGR:PSME, (7:2:1); PSME and ABGR appear to be ingrowth.

Insect and Disease Summary: Laminated root rot and Annosus root disease severities are low in ABGR and ABLA; laminated root rot severity in PSME was also low. Mistletoe severity is moderate in the scattered residual sawtimber PSME and LAOC overstory. This stand has the highest treatment priority.

Management Recommendations: HOR immediately the residual overstory LAOC and PSME within the stand and on the southwest perimeter. SPC the understory, removing as much ABGR and ABLA ingrowth as possible.

STAND NUMBER - Blue Divide 210

Current Stand Description: All ages and size classes are represented.

Overstory: Mature sawtimber LAOC, PSME, and ABGR.

Understory: Poletimber, immature sawtimber, and sawtimber ABGR, PSME, LAOC, PICO, and PIMO.

Insect and Disease Summary: LAOC mistletoe severity is moderate, PSME mistletoe severity is low. Laminated root rot damage severity is moderate in ABGR, ABLA, and PSME; Annosus root disease severity is moderate in ABGR and low in ABLA. Blister rust hazard is high. Most root-diseased ABGR are attacked by fir engraver beetles.

Management Recommendations: HOR removing the dwarf mistletoe infected mature overstory sawtimber. HTH the understory, feature PSME, ABGR, ABLA, and LAOC when not in root rot centers, and LAOC, PICO, and PIMO in Annosus root disease and laminated root rot infection centers. Maintain as much LAOC as possible for future HSH or HCR regeneration harvest. Stand after thinning should be a blend of large poletimber to sawtimber.

STAND NUMBER - Blue Divide 211

Current Stand Description: 2-storied.

Overstory: Sawtimber ABLA, ABGR, LAOC, PSME, and a few scattered PIMO.

Understory: Poletimber to immature sawtimber ABLA, LAOC, ABGR, PSME, PIMO.

Insect and Disease Summary: Laminated root rot damage severity is moderate in ABGR and PSME, damage severity is low in LAOC and ABLA. Incidence of brown cubical butt decay is moderate in large sawtimber PSME; incidence of rust red stringy rot in ABGR is low. Mistletoe incidence in LAOC is moderate; blister rust hazard is moderate.

Management Recommendations: HTH from below, featuring LAOC, ABLA, and PIMO. Discriminate against ABGR, ABLA, and PSME in laminated root rot centers. Consider shortening the rotation to begin stand management that will correct the root disease problem. In 40 years HSH, featuring LAOC, ABLA, PIMO. Plant blister rust resistant PIMO genotypes and LAOC in old root rot centers. When thinning, reserve as many of the best sawtimber LAOC as future seed trees.

STAND NUMBER - Blue Divide 212

Current Stand Description: 3-storied.

Overstory: Sawtimber ABGR, ABLA, PSME. North 1/2 of the stand is primarily ABLA, the south 1/2 is primarily ABGR.

Understory: Sapling, poletimber and immature sawtimber ABGR, ABLA, LAOC, PIMO.

Insect and Disease Summary: Laminated root rot and Annosus root disease severities are moderate in ABGR and ABLA; laminated root rot severity is low in PSME. Brown cubical butt rot incidence is moderate in large sawtimber PSME; rust red stringy rot incidence is low in large sawtimber ABGR. Blister rust hazard is high in the eastern 1/2 of the stand and only moderate in the western 1/2. Mistletoe severities in PSME and LAOC are low and very low, respectively.

Management Recommendations: HTH, featuring a mix of LAOC and PIMO in the root disease centers. Shorten the rotation and convert to LAOC, PIMO, PSME (3:1:1). Maintain an adequate stocking of the best sawtimber LAOC for future seed trees. Remove all ABLA, ABGR, and PSME in root disease centers and buffers around them equivalent to two normal tree spacings.

STAND NUMBER - Blue Divide 213

Current Stand Description: Plantation.

Overstory: Sapling to small poletimber PIPO with scattered PICO, ABLA, ABGR, and PSME ingrowth.

Insect and Disease Summary: Some of the planted PIPO are infected by western gall rust (Endocronartium harknessii). Blister rust hazard is moderate in PIMO on the perimeter of the plantation.

Management Recommendations: Stand 213 is Reforestation Project Unit No. 4-71A. Treatment priority is very low. The current planting appears to be off-site and future growth potential is questionable. PSME, ABGR, ABLA, LAOC are perhaps better choices for this site. The stand will need to be spaced in the next 10 years; if treated in the current proposed sale, reduce the stocking by SPC favoring naturals, if spaced in 10 years by HTH. Remove small and poor vigor trees.

STAND NUMBER - Blue Divide 214

Current Stand Description: 2-storied. The north 1/2 is predominantly ABLA, ABGR, PSME; the south 1/2 is LAOC, ABLA, ABGR, PSME, Engelmann spruce (PIEN), and mountain hemlock (TSME).

Overstory: Sawtimber ABLA, ABGR, PSME, PIMO, LAOC.

Understory: Poletimber to immature sawtimber ABLA, ABGR, PIEN, TSME, and PSME.

Insect and Disease Summary: Laminated root rot damage severity is moderate in ABLA and ABGR. Annosus root disease affects ABLA and ABGR at low severity levels. Mistletoe is light in both PSME and LAOC, and blister rust hazard is high.

Management Recommendations: Most of the laminated root rot straddles the 9738111 Road; mortality is visible on the aerial photographs. The areas of concentrated mortality are in the middle third of the stand. We recommend HTH, cut out the root rot infection centers and a buffer of two normal tree spacings, capturing the volume at this entry. There are no alternative species options within infection centers in the current stand. Remove mistletoe infected trees whenever possible, leave tree DMR's < 3, lower 1/3 crown. Thin with an eye for a future HCR or HSH regeneration cut, leaving as many LAOC and PSME as possible. Shorten the rotation and convert to LAOC, PSME with some PIEN in the southern portion of the unit. Discriminate against ABLA, ABGR, and PSME in root rot infection centers for the remainder of this rotation and in the future regeneration prescription.

STAND NUMBER - Blue Divide 215

Current Stand Description: All age and size classes are represented.

Overstory: Sawtimber to immature sawtimber ABLA, ABGR, LAOC, and PSME.

Understory: Seedling, sapling, and poletimber ABLA, ABGR, PIMO, PICO, and PSME. Seedlings and saplings are ABLA and ABGR.

Insect and Disease Summary: The stand has been devastated by partial cutting; Armillaria root disease severity in ABLA is moderate throughout the stand. PICO is damaged by Atropellis canker (*Atropellis piniphila*); damage severity is low. LAOC mistletoe incidence in PICO and LAOC is moderate. PICO is a secondary host to LAOC mistletoe. Blister rust hazard is high.

Management Recommendations: This stand has the highest silviculture treatment priority and a very high pest management treatment priority. We recommend regeneration by HCC or HCR. Plant LAOC and PSME (3:2). Use prescribed fire throughout the rotation to destroy ABLA and ABGR ingrowth. Avoid planting PSME in laminated root rot or Armillaria root disease centers. Stocking of mature LAOC and PSME is probably too low to regenerate by HSH.

STAND NUMBER - Blue Divide 216

Current Stand Description: 2-storied.

Overstory: Mostly sawtimber with scattered mature sawtimber PSME, ABGR, LAOC, and ABLA.

Understory: Poletimber to immature sawtimber in a very broad mix of species including PSME, ABGR, ABLA, PICO, PIMO, LAOC, TSME, and PIEN.

Insect and Disease Summary: Laminated root rot and Annosus root disease severities are low or very low in ABLA and ABGR; laminated root rot severity in PSME is very low. Mistletoe incidence and severity are low in LAOC and PSME. There are no other major insect or disease problems in the stand. Blister rust hazard is high.

Management Recommendations: HTH from below, featuring PSME or LAOC whenever possible. Treatment can be delayed 20 years with no adverse consequence. Leave tree DMR = 0.

STAND NUMBER - Blue Divide 217

Current Stand Description: Single story, even-aged.

Overstory: Poletimber PICO with a very few scattered ABLA and ABGR saplings.

Insect and Disease Summary: There are no apparent disease problems. The stand is overstocked and in need of spacing; pine engraver (Ips spp.) and mountain pine beetles are active in the stand at low levels.

Management Recommendations: HTH, reducing the current stocking by 40-50%. Pest management treatment priority is moderate, silviculture priority is high.

STAND NUMBER - Blue Divide 218

Current Stand Description: 2-storied.

Overstory: Sawtimber to mature sawtimber ABLA, PSME, ABGR, LAOC.

Understory: Poletimber to immature sawtimber ABLA, ABGR, PSME, LAOC.

Insect and Disease Summary: Mistletoe incidence in LAOC is low, blister rust hazard is high. Annosus root disease severity is low in ABLA and ABGR. Large sawtimber PSME has some brown cubical butt rot and a low incidence of red ring rot (Phellinus pini). Pest problems are not significant in this stand.

Management Recommendations: HTH from below, featuring PSME, LAOC, and ABLA mix when outside of Annosus root disease centers, and PSME and LAOC in disease centers. Treat all ABLA and ABGR stumps immediately after felling with borax (sodium tetraborate decahydrate, EPA Reg. No. 1624-94 Sept. 1972).

STAND NUMBER - Blue Divide 219

Current Stand Description: 2-storied.

Overstory: Scattered mature sawtimber PSME, ABGR, constituting less than 6-8% of the total stocking.

Understory: Large poletimber to sawtimber PICO (75%), and poletimber to immature sawtimber ABGR, PSME, ABLA, PIMO, and LAOC (25%).

Insect and Disease Summary: Atropellis canker, western gall rust, and stalactiform rust (Cronartium stalactiforme) are all present in the stand, but there is no significant damage associated with these pathogens. The incidence of new mountain pine beetle attacks is increasing and damage severity is currently moderate. The lodgepole pine is mature and should be regenerated. Mountain pine beetle hazard is high. Douglas-fir beetle is also present in the stand, but new attack frequency is low.

Management Recommendations: HSH without delay, featuring PSME, LAOC and PICO. Remove all merchantable ABGR and ABLA in the seedcut; destroy any ABLA or ABGR advance reproduction with prescribed fire. This stand has the highest treatment priority.

STAND NUMBER - Blue Divide 220

Current Stand Description: All age and size classes are represented. The eastern portion of the stand is primarily ABGR climax vegetation; moving west the climax associations are primarily ABLA.

Overstory: Sawtimber to mature sawtimber ABGR, PSME, and ABLA.

Understory: Poletimber to immature sawtimber ABGR, PSME, and ABLA with scattered LAOC and PICO. Seedling and sapling ABGR, ABLA, LAOC and PICO; PSME is not regenerating in the understory.

Insect and Disease Summary: Laminated root rot damage severity is either high or severe in ABLA, ABGR, and PSME. This stand may have the worst root rot problem of any in the proposed Sale Area. Annosus root disease damage severity is low in the true fir, and mistletoe incidence is low in LAOC and PSME. Blister rust hazard is moderate throughout. Brown cubical butt rot incidence in mature sawtimber PSME ranges from low to moderate across the stand.

Management Recommendations: Regenerate by HCC. Plant LAOC and PIMO genotypes with demonstrated resistance to blister rust. Discriminate against ABLA, ABGR, and PSME throughout the next rotation during precommercial and commercial thinnings and with the judicious use of prescribed fire. This stand has the highest treatment priority.

STAND NUMBER - Blue Divide 221

Current Stand Description: All age and size classes are represented.

Overstory: Immature sawtimber to sawtimber ABGR, ABLA, PSME with a few scattered LAOC.

Understory: Seedling, sapling, and poletimber ABGR and ABLA.

Insect and Disease Summary: Laminated root rot damage severity ranges from moderate to high in PSME, ABGR, and ABLA. Mortality associated with Armillaria root disease is low to moderate in ABGR and ABLA. Both LAOC and PICO are mistletoe infected, and incidence is low in the overstory. Mistletoe incidence in PSME is low, and blister rust hazard is high. Fir engraver attack frequency is low to moderate in root-diseased ABLA and ABGR and will continue to build with the increase in root disease.

Management Recommendations: Regenerate by HCC. Plant LAOC and PSME. Avoid planting PSME in root disease infection centers. Require the purchaser to mark stumps of laminated root rot infected ABLA, ABGR, and PSME under the special C-provision No. C6.412-Stump Marks.

STAND NUMBER - Blue Divide 222

Current Stand Description: All age and size classes are represented.

Overstory: Sawtimber LAOC, PSME, PICO, ABGR.

Understory: Sapling to poletimber ABGR.

Insect and Disease Summary: Mistletoe severity is moderate in LAOC; most of which is located in the northwest section of the stand adjacent to the 9702 Road. Annosus root disease damage severity ranges from moderate to high; most of the mortality is concentrated near the south end of the unit. The Annosus root disease center at the south end is continuous on the other side of the draw. Laminated root rot severity is moderate in ABGR and PSME, and very low in LAOC. This stand is a prime example of the relationship between increasing root disease and successive partial cutting.

Management Recommendations: Divide the stand into two cutting units, regenerate by HCC the southeastern 1/2 of the stand. Destroy all ABGR advance reproduction. Plant LAOC, PICO, and PIMO genotypes with demonstrated resistance to blister rust. Eliminate ABGR ingrowth periodically with prescribed fire. Regenerate by HSH, the northwestern 1/2 of the stand featuring LAOC. Select mistletoe-free seed trees whenever possible. Seed tree DMR < 3, lower half of crowns. The cutting unit in the southern portion has the highest treatment priority; the treatment priority for the northern unit is somewhat less. Be sure to extend the boundary of the southern cutting unit to include the entire Annosus root disease center on both sides of the draw.

STAND NUMBER - Blue Divide 223

Current Stand Description: All age and size classes are represented.

Overstory: Scattered mature sawtimber PSME, ABGR, ABLA.

Understory: Immature sawtimber to sawtimber ABGR, PSME, ABLA. Seedling and sapling ABGR and ABLA.

Insect and Disease Summary: Dwarf mistletoe incidence is low in LAOC and PSME. Armillaria root disease severity is moderate in ABLA and ABGR; PSME is unaffected. Laminated root rot damage severity is low in all species. Brown cubical butt rot damage severity is low in large sawtimber PSME, as are the cull losses to quinine conk (Laricifomes officianalis). Blister rust hazard is high.

Management Recommendations: Regenerate by HCC the northern 1/2 of the stand. Plant a 1:1 mixture of LAOC and PSME; only LAOC in the root disease centers. Merchantable stocking is considerably less in the northern 1/2. In the southern cutting unit, HOR using a 18- or 20-inch diameter limit cut. HTH the understory conserving LAOC and PSME stocking. Leave tree DMR = 0. Regenerate in 30-40 years by HCC, planting LAOC and PSME. Periodically destroy ABLA and ABGR ingrowth with prescribed fire. Discriminate against PSME, ABGR, and ABLA in all laminated root rot centers, ABGR and ABLA in all Armillaria root disease centers.

STAND NUMBER - Blue Divide 224

Current Stand Description: 3-storied.

Overstory: Immature sawtimber to sawtimber LAOC, ABGR, PSME, and PIMO.

Understory: Seedling, sapling, and poletimber ABGR and PSME.

Insect and Disease Summary: Mistletoe damage severity is very minor in LAOC and PSME. Laminated root rot damage severity is moderate in ABGR and PSME; Annosus root disease damage severity is low in ABGR.

Management Recommendations: Regenerate by HCR or HSH, featuring LAOC. Destroy or remove all unmerchantable ABGR with tractor piling of slash and scarification. There will be little volume available to make this unit commercially attractive since most of the volume is in the overstory LAOC which will be retained as a seed source, i.e., hard money pest management.

STAND NUMBER - Blue Divide 225

Current Stand Description: 2-storied.

Overstory: Immature sawtimber to sawtimber ABGR, LAOC, PICO, and PIMO.

Understory: Sapling to poletimber ABGR, ABLA, PICO, LAOC, TSME, PSME. PSME was a major stand component prior to partial cutting.

Insect and Disease Summary: Annosus root disease and laminated root rot damage severities are moderate in ABGR; laminated root rot severity is moderate in PSME, and very low in LAOC. Armillaria root disease severity is low in ABGR. Mistletoe incidence and severity are low in LAOC and moderate in PSME. Blister rust hazard is moderate.

Management Recommendations: This stand has the highest treatment priority. Previous partial cutting and salvage entries have eliminated most of the sawtimber PSME. Much of the current overstory is ABGR, most of which is badly scarred from previous entries. Advance regeneration is primarily ABGR and ABLA. The stand will continue to succeed towards a climax vegetation with root disease incidence and severity increasing. We recommend immediate regeneration by HCC, prescribed burn, plant to LAOC, PICO, PIMO, PSME. Avoid planting PSME in laminated root rot centers and appropriate buffers. PIMO genotypes should be those with demonstrated resistance to blister rust. Control ABGR and ABLA ingrowth with frequent use of prescribed fire. There is adequate volume to make a regeneration harvest commercially operable. We recommend that management of the current overstory is a poor risk because of the high incidence of wounding and the high risk of future losses to stem decay.

STAND NUMBER - Blue Divide 226

Current Stand Description: 2-storied.

Overstory: Immature sawtimber to sawtimber ABGR, PSME, LAOC, PICO, PIMO.

Understory: Sapling to poletimber ABGR, PSME, PICO, LAOC.

Insect and Disease Summary: Mistletoe incidence and severity are moderate in PSME and LAOC; LAOC is a minor stand component. Root disease damage is limited to low severity Armillaria root disease in ABGR. Blister rust hazard is moderate.

Management Recommendations: Regenerate by HCC the middle 1/3 of the stand. Plant PSME, LAOC, PICO. Destroy ABGR ingrowth at regular intervals with recurrent use of prescribed fire. Defer regeneration of the northern and southern thirds until the current overstory is merchantable. At that time, regenerate by HCC, plant to PSME, LAOC, PICO. PIMO may also be planted if resistant genotypes are available. Discriminate against ABGR ingrowth throughout the rotation.

STAND NUMBER - Blue Divide 227

Current Stand Description: 3-storied.

Overstory: Immature sawtimber to sawtimber ABGR, PSME, LAOC, PIMO. Overstory was previously mature sawtimber PSME, PIPO, and LAOC. Current overstory is light and scattered.

Understory: Seedling, sapling, and poletimber ABGR, with lesser amounts of PSME, PIMO, and PICO.

Insect and Disease Summary: Mistletoe damage severity in LAOC and PSME is low. Annosus root disease severity ranged from moderate to high in ABGR. Damage associated with Annosus root disease is likely to increase with time since most of the advance regeneration is ABGR. Past partial cutting has eliminated natural regeneration opportunities by removing the prefered regeneration species i.e., PSME, PIPO, and LAOC.

Management Recommendations: Regenerate by HCC. Plant PIPO, PSME, LAOC in an even mix. Discriminate against ABGR ingrowth throughout the rotation with periodic prescribed fire.

STAND NUMBER - Blue Divide 228

Current Stand Description: All age and size classes are represented.

Overstory: Sawtimber ABGR, PICO, PIMO with scattered sawtimber to mature sawtimber PIPO, PSME, and LAOC.

Understory: Seedling, sapling, and poletimber ABGR with lesser amounts of LAOC and PIMO.

Insect and Disease Summary: Annosus root disease damage severity ranges from high to very high in ABGR; PIPO is unaffected. Mistletoe severity is moderate in LAOC, low in PSME. PIMO does quite well on this site; blister rust hazard is moderate. Mountain pine beetle attack severity in PIMO and PICO is moderate; most attacks are successful.

Management Recommendations: This stand has the highest treatment priority. Regenerate by HCR or HCC. Feature LAOC, PSME, and PIMO. ABGR should not be managed due to the severity of Annosus root disease. PIMO should be planted only if resistant genotypes are available. Defer entry into the northwest corner of the stand. This area consists of healthy poletimber LAOC, PIPO, PIMO, and ABGR, and should be treated as a separate cutting unit. HSA in 20 years, leave tree DMR < 3, lower third of crowns. Discriminate against ABGR in the sanitation thinning whenever possible. Treat ABGR stumps with Borax immediately after thinning.

STAND NUMBER - Blue Divide 229

Current Stand Description: 2-storied.

Overstory: Poletimber to immature sawtimber LAOC, PICO, and PSME in the western 1/2, ABGR in the eastern 1/2.

Understory: Sapling to immature poletimber ABGR.

Insect and Disease Summary: Mistletoe incidence and damage severity is high in LAOC, especially in 6- to 8-inch poles. Other species are healthy.

Management Recommendations: HSA with leave tree DMR < 3; infections confined to the lower 1/3 of crowns. Regenerate by HCR or HSH in 20-30 years, featuring LAOC, PSME, PICO, and PIMO.

STAND NUMBER - Blue Divide 230

Current Stand Description: Single story.

Overstory: Poletimber LAOC, PICO, PSME.

Insect and Disease Summary: Mistletoe damage severity is low in PSME and LAOC. Laminated root rot damage severity is currently low in PSME. Evidence from old stumps indicates that laminated root rot might have been quite severe in the former stand which consisted of sawtimber to mature sawtimber PSME and LAOC. PICO and LAOC have all but replaced PSME in the old infection centers. While LAOC and PSME mistletoe severities are low overall, there are pockets of mistletoe in PSME where damage is quite severe. The incidence of Atropellis cankering in PICO is moderate.

Management Recommendations: HTH, removing Atropellis cankered PICO stems whenever possible, and mistletoe-infected PSME and LAOC. Leave tree DMR < 3, with infections limited to the lower 1/3 crown. Laminated root rot was once severe in this stand and has been controlled by the succession to PICO and LAOC. We recommend regeneration by HCR or HSH in 30-40 years, featuring LAOC, PSME, and PICO. Discriminate against PSME in the laminated root rot infection centers that are currently active.

STAND NUMBER - Blue Divide 231

Current Stand Description: 2-storied.

Overstory: Poletimber to sawtimber LAOC, PIPO, PSME, and ABGR.

Understory: Sapling to immature, suppressed poletimber ABGR.

Insect and Disease Summary: The incidence of Armillaria root disease is low in PSME; no other species are affected. Dwarf mistletoe incidence and severity are low in PSME, moderate in LAOC. Recent successful mountain pine beetle and western pine beetle attacks were noted in PIPO, damage was minor.

Management Recommendations: Defer treatment 10 years or more. Thereafter HTH, featuring LAOC, PIPO, and PSME. Regenerate by HSH 20-30 years after the thinning, again featuring LAOC, PIPO, and PSME. Fill-in plant PIPO if necessary.

STAND NUMBER - Blue Divide 232

Current Stand Description: 2-storied.

Overstory: Poletimber to immature sawtimber PICO, ABGR, PSME, PIPO, and LAOC.

Understory: Seedling and sapling ABGR, PSME and PIPO.

Insect and Disease Summary: Pests are not currently a management concern.

Management Recommendations: Stocking is highly variable in this stand. We recommend that several cutting units be created at the time of sale layout to account for differences in stocking and species composition. Overstocked cutting units are in need of SPC. From a silvicultural standpoint, these stands should be thinned without delay. Entry into the remainder of the stand can be deferred 15-30 years. At that time, HTH from below, feature LAOC, PSME, and PIPO as they occur.

STAND NUMBER - Blue Divide 233

Current Stand Description: All age and size classes are represented.

Overstory: Scattered sawtimber to mature sawtimber PIPO, PSME, and LAOC.

Understory: Sapling, poletimber, and immature sawtimber PICO, PSME, ABGR, LAOC. Advance regeneration is suppressed ABGR.

Insect and Disease Summary: Dwarf mistletoe is severe in large overstory PSME in the southwest portion of the stand; moderate to high over the rest of the stand. Mistletoe severity is moderate in LAOC, with most of the infection concentrated in the northeast portion of the stand. Armillaria root disease severity is moderate; PIPO and ABGR saplings are killed.

Management Recommendations: We recommend immediate HOR to remove the severely mistletoe-infected sawtimber PSME and LAOC. Subsequent treatment of the understory may be delayed 15-30 years. At that time, HTH from below, featuring PIPO, PSME, and LAOC, with leave tree DMR < 3 and mistletoe infections in leave trees restricted to the lower 1/3 of crowns.

STAND NUMBER - Blue Divide 234

Current Stand Description: All age and size classes are represented.

Overstory: Sawtimber to mature sawtimber PIPO, LAOC, PSME, ABGR, PIMO.

Understory: Poletimber to immature sawtimber ABGR, PSME, PIPO; seedling and sapling ABGR, PSME.

Insect and Disease Summary: Annosus and Armillaria root disease damage severities are very low in ABGR; laminated root rot damage severity is low. Mistletoe damage is minor in LAOC and PSME.

Management Recommendations: Defer regeneration harvest for 10-20 years until the immature sawtimber is merchantable. At that time, regenerate by HCC the west 1/4 of the stand and plant to PIPO, LAOC, and PIMO. Regenerate the remainder of the stand by HSH or HCR methods featuring PIPO and LAOC.

STAND NUMBER - Blue Divide 235

Current Stand Description: All age and size classes are represented.

Overstory: Clumped immature or mature sawtimber PIPO, PSME, ABGR, and LAOC.

Understory: Sapling to poletimber PIPO, PSME; seedling ABGR.

Insect and Disease Summary: Pest management concerns are minimal in this stand.

Management Recommendations: Defer treatment 10-20 years. Then HOR mature sawtimber PIPO, PSME, and ABGR. HTH the understory featuring PIPO, PSME, and LAOC. Slash and burn understory ABGR. Leave tree DMR < 3, lower 1/3 of crowns.

STAND NUMBER - Blue Divide 236

Current Stand Description: All age and size classes are represented.

Overstory: Scattered mature sawtimber ABGR and PSME.

Understory: Seedling, sapling, poletimber, and immature sawtimber ABGR, PSME, LAOC, PICO, and PIMO.

Insect and Disease Summary: Laminated root rot damage severity is moderate in ABGR and PSME. Armillaria root disease severity is low in ABGR and PSME and very low in PICO. Mistletoe severity is low in LAOC and PICO. Annosus root disease severity is surprisingly low in ABGR. Blister rust hazard is high. The stand has been severely damaged by partial cutting.

Management Recommendations: Defer treatment 10-20 years. Then HTH from below, featuring PICO, LAOC, PSME and ABGR. Discriminate against ABGR and PSME in root disase centers. Leave tree DMR < 3, lower third. Leave PICO and LAOC in Armillaria root disease and laminated root rot infection centers. Eventually regenerate to LAOC, PICO.

STAND NUMBER - Blue Divide 237

Current Stand Description: 2-storied.

Overstory: Immature sawtimber ABGR, PICO, PSME, and LAOC. The best sawtimber PSME has been highgraded.

Understory: Sapling and poletimber ABGR, PICO, and LAOC.

Insect and Disease Summary: LAOC and PSME mistletoe severities are low; Armillaria root disease severity is low in ABGR. Blister rust hazard is moderate.

Management Recommendations: HTH from below, featuring a mix of species. Discriminate against ABGR whenever possible.

STAND NUMBER - Blue Divide 238

Current Stand Description: All age and size classes are represented.

Overstory: Scattered sawtimber to ABGR, PSME, PICO, and LAOC.

Understory: Seedling, sapling, poletimber, and immature sawtimber ABGR, PSME, and PICO.

Insect and Disease Summary: Laminated root rot damage severity is high in ABGR and PSME. Annosus root disease severity in ABGR is very low. Armillaria root disease severity is low in ABGR and very low in PSME. The incidence of rust red stringy rot is moderate in ABGR; brown cubical butt rot incidence in PSME is low. Mistletoe incidence is moderate in LAOC, low in PICO. Blister rust hazard is high.

Management Recommendations: Defer treatment 10-20 years until immature sawtimber is merchantable. Thereafter, regenerate by HCC, plant LAOC, PICO, and PSME. Avoid planting PSME in root rot infection centers and associated buffers. Discriminate against PSME and ABGR ingrowth within infection centers for the length of the rotation.

STAND NUMBER - Blue Divide 239

Current Stand Description: Overstocked; all age and size classes are represented.

Overstory: Sawtimber PSME, ABGR, PICO with mature sawtimber PSME, ABGR, and LAOC.

Understory: Sapling, poletimber, and immature sawtimber ABGR, PSME, and PICO.

Insect and Disease Summary: Armillaria root disease, Annosus root disease, and laminated root rot damage severities are low in ABGR and PSME; mistletoe severity in LAOC and PSME is moderate. Blister rust hazard is high.

Management Recommendations: HTH from below featuring a mix of species. Discriminate against PSME and ABGR in root disease centers and in buffers equivalent to two normal tree spacings. Ultimately regenerate to LAOC, PICO, PSME. Leave tree DMR = 0. Treat ABGR stumps > 18 inches with Borax.

STAND NUMBER - Blue Divide 240

Current Stand Description: Single story.

Overstory: Poletimber to sawtimber ABGR, PSME, LAOC, PICO.

Insect and Disease Summary: Laminated root rot severity is moderate in ABGR, low in PSME. Armillaria root disease severity is low in ABGR; PSME is unaffected. Mistletoe severity is moderate in LAOC, low in PSME. ABGR is also affected by Annosus root disease, but damage is minimal. Blister rust hazard appears to be low in this stand. Fir engraver damage is currently low and increasing with increasing root disease.

Management Recommendations: HTH from below, favoring PICO, PSME, and LAOC. Leave tree DMR < 3, lower 1/3 of crowns. Regenerate in 30-40 years by HCC. Plant to LAOC, PIPO, PICO, PSME, and PIMO with phenotypic resistance to blister rust. Discriminate against ABGR and PSME in root disease centers.

STAND NUMBER - Blue Divide 241

Current Stand Description: Single-story.

Overstory: Poletimber to immature sawtimber PSME, ABGR, LAOC, with scattered PIPO and PICO.

Insect and Disease Summary: PIPO, PSME, and LAOC are mistletoe infected. PSME mistletoe incidence and severity are low; western dwarf mistletoe severity in PIPO is very low; mistletoe severity in LAOC is moderate. Armillaria root disease severity is low in PIPO, PSME, and ABGR, and very low in PICO. Laminated root rot severity is low in ABGR and PSME; Annosus root disease severity is low in ABGR. Blister rust hazard appears to be low.

Management Recommendations: HTH from below, featuring PSME, LAOC, PICO, and PIPO. Discriminate against ABGR ingrowth with periodic use of prescribed fire. Leave tree DMR = 0. Discriminate against ABGR and PSME in root disease centers. Ultimately regenerate to PIPO, LAOC, and PSME.

STAND NUMBER - Blue Divide 242

Current Stand Description: 2-storied.

Overstory: Poletimber to immature sawtimber ABGR, PICO, and PSME with scattered LAOC.

Understory: Seedling and sapling ABGR, PICO with a lesser stocking of PSME and PIMO.

Insect and Disease Summary: Laminated root rot damage is severe in ABGR, high in PSME, and low in LAOC. LAOC and PICO are infected with mistletoe; damage severity is low in both. Annosus root disease severity is low in ABGR; the incidence of stem decay associated with the Indian paint fungus is also low. Blister rust hazard is high. The incidence of western gall rust in PICO is moderate. The frequency of successful fir engraver attacks on declining ABGR is high; Douglas-fir beetle attack frequency on declining PSME is moderate.

Management Recommendations: Defer treatment 20-30 years until the overstory is merchantable. Thereafter, regenerate by HCC and plant LAOC and PICO. Discriminate against ABGR and PSME in this stand throughout the rotation.

STAND NUMBER - Blue Divide 243

Current Stand Description: All age and size classes are represented.

Overstory: Scattered mature sawtimber PIPO.

Understory: Poletimber to immature sawtimber LAOC, PICO, ABGR, with scattered PSME and PIPO. Seedling and sapling ABGR and PICO.

Insect and Disease Summary: Root disease problems are of minor significance in this stand. LAOC mistletoe incidence and severity are moderate in LAOC and low in PICO. Mistletoe incidence in PSME is low. Blister rust hazard is high. Mountain pine beetle attack frequency in PICO is low.

Management Recommendations: HOR and HTH in the understory, featuring LAOC, PICO, PSME mix; including ABGR when necessary to maintain acceptable stocking. Leave tree DMR < 3, lower 1/3 of crowns.

STAND NUMBER - Blue Divide 244

Current Stand Description: 2-storied.

Overstory: Poletimber to immature sawtimber ABGR, PSME, LAOC.

Understory: Seedling and sapling ABGR with PSME.

Insect and Disease Summary: Laminated root rot damage severity is high in ABGR and PSME; Armillaria root disease severity is low. Mistletoe severity is moderate in PSME and low in LAOC. Blister rust hazard is high.

Management Recommendations: The stand has been destroyed by past highgrade logging practices. We recommend regeneration by HCC. Plant LAOC, PICO, and PSME. Consider planting a mix to include PIPO near the top of the unit. Avoid planting PSME in laminated root rot infection centers. Discriminate against ABGR ingrowth throughout the next rotation with periodic use of prescribed fire. The current stand is about 60-70% stocked with poletimber to immature sawtimber ABGR and PSME. If regeneration is delayed 15-30 years to increase the merchantability of the overstory, root disease losses will continue to escalate. With such a delay, 30-40% of the final harvest volume will likely be lost to root disease.

STAND NUMBER - Blue Divide 245

Current Stand Description: 3-storied.

Overstory: Scattered mature sawtimber PIPO and PSME.

Understory: Poletimber to immature sawtimber PICO, ABGR, PSME, and LAOC. Seedling and sapling ABGR.

Insect and Disease Summary: Mistletoe incidence and severity are moderate in PSME and LAOC; incidence in PICO is low. Mistletoe incidence is moderate to high in one area of LAOC poletimber in the center of the stand. Some ABGR are infected with hemlock dwarf mistletoe, but damage severity is low. Laminated root rot damage severity is low in ABGR and PSME; blister rust hazard is moderate.

Management Recommendations: Treatment is easily delayed 10 years. We recommend HOR removing all mistletoe-infected overstory ABGR, LAOC, PICO and PSME. In the extreme northern and eastern limits of the stand are areas with healthy sawtimber and mature sawtimber PIPO. Consider retaining these PIPO for a future seed source. HTH the understory, discriminating against ABGR whenever possible. Manage ABGR ingrowth in the future with periodic prescribed fire. Feature LAOC and PICO in laminated root rot infection centers during commercial thinning.

STAND NUMBER - Blue Divide 246

Current Stand Description: 2-storied.

Overstory: Large poletimber to immature sawtimber PSME, ABGR, LAOC, with a few scattered PICO.

Understory: Seedling and sapling PSME and ABGR.

Insect and Disease Summary: Laminated root rot severity is moderate in ABGR and PSME; Armillaria root disease severity is low in these same species. Mistletoe severity is very low in PSME and moderate in LAOC. Blister rust hazard is moderate.

Management Recommendations: HTH from below, leave tree DMR < 3, lower 1/3 crown. Discriminate against PSME and ABGR in root disease centers, including adequate buffers equivalent to two normal tree spacings. The sawtimber is larger in the middle portion of the stand; you may wish to delimit a separate cutting unit at the time of sale layout, with different thinning guidelines.

STAND NUMBER - Blue Divide 247

Current Stand Description: All age and size classes are represented.

Overstory: Lightly scattered sawtimber PIPO, LAOC, and PSME.

Understory: Poletimber to immature sawtimber PSME, ABGR, LAOC, and PICO. Seedling and sapling PIPO, ABGR, and PSME.

Insect and Disease Summary: Laminated root rot damage severity is very high throughout the stand. Mortality is particularly severe in the southeast 2/3 of the stand. Laminated root rot severity is moderate to high in PSME, high to very high in ABGR. Damage associated with Annosus root disease is low in ABGR. A very low incidence of Armillaria root disease was observed in PIPO; no other species were affected. Mistletoe incidence and severity were moderate in PSME and LAOC. In the northeast third of the stand, stem decay was observed in poletimber to sawtimber ABGR. Nearly all stem decay was associated with the heartrot fungus Pholiota limonella. Moderate severity brown cubical butt rot was observed in sawtimber PSME.

Management Recommendations: This stand has the highest treatment priority. We recommend HTH from below, leave tree DMR < 3, lower 1/3 of crowns. Feature LAOC, PIPO, and PICO in all laminated root rot centers including buffers. Carry as much LAOC and PIPO as possible. Regenerate in 40 years to LAOC, PIPO. Discriminate against PSME and ABGR for the remainder of this rotation through the regeneration phase of the next rotation. PIPO should do very well on this site.

STAND NUMBER - Blue Divide 248

Current Stand Description: 3-storied.

Overstory: Mature sawtimber to overmature sawtimber PIPO.

Understory: Predominantly sapling to poletimber ABGR, PSME, LAOC, and PICO with a few scattered immature sawtimber LAOC, ABGR, and PSME.

Insect and Disease Summary: Mistletoe damage severity is moderate in PSME and LAOC. Laminated root rot severity is high in PSME and ABGR, and low in LAOC.

Management Recommendations: HTH from below. Remove all mistletoe-infected stems, i.e., leave tree DMR = 0. Feature PIPO, LAOC, PSME, and PICO; discriminate against ABGR and PSME in root rot infection centers and buffers of two normal tree spacings. Regenerate in 40 years by HSH to PIPO, LAOC. HFR within 5 years of the seed cut. The stand is in a foreground retention visual quality class adjacent to Highway 97. Consider underplanting the seed trees to PIPO and LAOC immediately following the seed cut. Discriminate against ABGR throughout the stand with the use of periodic prescribed fire.

STAND NUMBER - Blue Divide 249

Current Stand Description: 3-storied.

Overstory: Mature sawtimber to overmature sawtimber PIPO.

Understory: Immature sawtimber to sawtimber PSME, PIPO, with ABGR and LAOC. Sapling and poletimber ABGR, PSME.

Insect and Disease Summary: Mistletoe severity is moderate in PIPO and PSME, and low in LAOC. Laminated root rot damage severity is moderate in ABGR and PSME. Armillaria root disease severity is low in PIPO; apparently other conifers are unaffected on this site. Annosus root disease is also found in PIPO but damage severity is low. ABGR is unaffected by Annosus root disease on this site. Elytroderma needle blight severity in sawtimber PIPO ranges from low to moderate.

Management Recommendations: Visual resources will be a major consideration with this stand given the close proximity to Highway 97. We recommend that the stand be regenerated by HSH, leaving the best overstory PIPO, LAOC and PSME as seedtrees; seedtree DMR < 3. A delay of 15-25 years to increase the merchantability of understory sawtimber and immature sawtimber is acceptable. Leave no ABGR seedtrees and slash the understory once the merchantable stems have been removed. Given the close proximity of the stand to Swauk Creek and its position on the slope, Elytroderma needle blight will continue to be a recurrent but manageable problem in PIPO. The future disease problem to be avoided is laminated root rot in PSME and ABGR. Stumps should be marked at the time of the regeneration cut under the new C-provision C6.412-Stump Marks. Related to the visual constraint, we recommend underplanting the overwood to PIPO, LAOC and PSME (2:2:1). Avoid planting PSME in root disease centers and buffers. Remove the overwood as soon as possible, before the new understory is 3 feet tall or 10 years old. A helicopter logging system may be applicable to the final removal of the overwood.

STAND NUMBER - Blue Divide 250

Current Stand Description: 3-storied.

Overstory: Sawtimber to mature sawtimber PIPO, PSME, with scattered LAOC and ABGR.

Understory: Poletimber to immature sawtimber PSME, PIPO, with ABGR. Seedling and sapling PSME, PIPO, ABGR.

Insect and Disease Summary: Annosus root disease severity is low in PIPO; ABGR is apparently unaffected on this site. Mistletoe damage severity is low in PIPO and high in PSME.

Management Recommendations: Ideally, we would recommend HSA to remove most of the severely mistletoe infected PSME; leave tree DMR < 3, lower 1/3 crown. The stand is adequately stocked at the present time, but may not be after the sanitation thinning. Realistically, we recommend HSH in 15-25 years as in the case of Stand 249 above. Delay treatment to improve the merchantability of the regeneration cut. Laminated root rot is not a pest management consideration for this stand, so PSME may be featured in the regeneration prescription along with PIPO and LAOC. Again, due to visual constraints, we recommend underplanting the overwood immediately after the regeneration cut. Seed tree DMR < 3 for PSME; seed tree DMR = 0 for PIPO. Remove the overwood as soon as possible to prevent reinvasion of the plantation by dwarf mistletoes.

STAND NUMBER - Blue Divide 251

Current Stand Description: Single-story.

Overstory: Poletimber to immature sawtimber PSME, ABGR, and PIPO.

Insect and Disease Summary: Armillaria root disease severity is moderate in PIPO and ABGR, low in PSME. The worst Armillaria root disease center lies east of the 9700119 Road in the southwest quarter of the stand. PSME mistletoe severity is moderate, with over 25% of the area in PSME currently infected.

Management Recommendations: We recommend a HSA removing the mistletoe infected PSME; leave tree DMR < 3, lower third. Continue to blend poletimber and immature sawtimber. Feature PIPO and ABGR in areas of extreme mistletoe infection, PSME adjacent to Armillaria root disease centers. Remove Armillaria root diseased PIPO and ABGR in disease centers and buffers equivalent to two normal tree spacings. Treatment may be deferred 10-15 years to improve the merchantability of the entry. Eventually regenerate to PSME, LAOC, PIPO.

STAND NUMBER - Blue Divide 252

Current Stand Description: Single-story.

Overstory: Poletimber to immature sawtimber PSME, ABGR with scattered microsites stocked with LAOC, PICO, and PIPO.

Insect and Disease Summary: Pest problems are minimal in this stand. Mistletoe damage severity is low in PSME, Annosus root disease severity is low in ABGR, and the incidence of Atropellis canker in PICO is low.

Management Recommendations: Defer entry 20 years. At that time, HTH from below, featuring PSME and LAOC, removing the mature PICO component. This stand has the lowest treatment priority.

STAND NUMBER - Blue Divide 253

Current Stand Description: 2-storied.

Overstory: Minor sawtimber PSME, LAOC component.

Understory: Predominantly poletimber to immature sawtimber ABGR, PSME, and LAOC.

Insect and Disease Summary: Laminated root rot damage severity is moderate in PSME and ABGR. Most of the root rot infection centers border the ridge near the southern boundary of the stand. Mistletoe damage is moderate in LAOC, low in PSME, especially near the ridgetop.

Management Recommendations: Defer treatment 15-20 years. Thereafter, HTH from below, featuring PSME and LAOC. Discriminate against PSME and ABGR within root rot centers and buffers. Eventually regenerate to PIPO, PSME and LAOC. Eliminate ABGR ingrowth with periodic prescribed fire.

STAND NUMBER - Blue Divide 254

Current Stand Description: All age and size classes are represented.

Overstory: Scattered sawtimber to mature sawtimber PIPO, PSME with ABGR.

Understory: Predominantly poletimber to immature sawtimber PIPO, PSME, ABGR. Seedling and sapling ABGR, PSME. The site becomes progressively drier going to the east. The western 1/2 of the stand is PIPO dominated, with PIPO reproducing in the understory; the eastern 1/2 is a mix of PSME and ABGR, with little PIPO, and ABGR and PSME reproducing in the understory.

Insect and Disease Summary: The overstory PIPO on the west end of the stand is mistletoe infected; damage severity is moderate. Armillaria root disease severity is low in PIPO, LAOC, and PSME. The largest infection centers lie along the southwest and southern borders of the stand.

Management Recommendations: Separate the stand into two cutting units. Defer treatment 15-20 years in the northeast 2/3 of the stand (first cutting unit). Thereafter HTH, leaving any PIPO and LAOC encountered in the thinning with a DMR < 3, lower 1/3 of crowns. Regenerate after an additional 20 years to PIPO, PSME, and LAOC. In the southwest 1/3 of the stand, HOR mature overstory PIPO. HSA understory, feature a blend of poletimber to sawtimber PIPO, PSME; leave tree DMR < 3, lower 1/3 of crowns.

STAND NUMBER - Blue Divide 255

Current Stand Description: 2-storied.

Overstory: Sawtimber to mature sawtimber PIPO, PSME.

Understory: Poletimber to immature sawtimber PSME, PIPO.

Insect and Disease Summary: Dwarf mistletoe is severe in PIPO and PSME. Mistletoe is most severe in PSME on south and southeast facing slopes and most severe in PIPO in the overstory.

Management Recommendations: HOR infected overstory PIPO and PSME. HSA understory, featuring a blend of poletimber to sawtimber PIPO, PSME; leave tree DMR < 4, lower 1/2 crowns. In the future, regeneration will be difficult on the exposed ridges. At the time of regeneration, HSH feature PIPO, PSME, leaving an ample number of seedtrees. Fill-in planting and staged removal cutting may be necessary.

STAND NUMBER - Blue Divide 256

Current Stand Description: All age and size classes are represented.

Overstory: Sawtimber to mature sawtimber PIPO with scattered PSME.

Understory: Poletimber to immature sawtimber PSME, PIPO. Seedling and sapling PSME and PIPO.

Insect and Disease Summary: Mistletoe damage severity is very low in PIPO and PSME. Armillaria root disease is present in PSME, ABGR, and PIPO; the root disease in PIPO lies along the northeast border of the west leg of the stand and is continuous with the infection center in Stand 254.

Management Recommendations: Defer entry 15-25 years. Consider HTH at that time.

STAND NUMBER - Blue Divide 257

Current Stand Description: 2-storied.

Overstory: Immature sawtimber to sawtimber PIPO with scattered PSME.

Understory: Sapling to poletimber PSME, PIPO with scattered ABGR and LAOC.

Insect and Disease Summary: Mistletoe severity is high to severe in PIPO, and low to moderate in PSME. The most severe mistletoe in PIPO is in the southeast 1/4 of the stand in the draw between the ridges. The worst mistletoe in PSME is in the northwest 1/3 of the stand.

Management Recommendations: HOR to remove mistletoe-infected overstory PIPO; HSA mistletoe infected understory PSME. Leave tree DMR < 3, lower 1/3 of crowns. Feature a mix of PIPO, PSME, and ABGR after the sanitation thinning. There is a considerably greater stocking of ABGR in the understory in the north 1/2 of the stand than the south 1/2. ABGR can be managed in this stand with caution. Stumps of sawtimber ABGR greater than 18 inches DBH should be treated with Borax immediately after falling.

STAND NUMBER - Blue Divide 258

Current Stand Description: 3-storied.

Overstory: Sawtimber to mature sawtimber PIPO with scattered PSME.

Understory: Poletimber to immature sawtimber PIPO, PSME, and ABGR. Sapling PSME and ABGR.

Insect and Disease Summary: Mistletoe damage severities are moderate in PIPO and PSME. The worst mistletoe in PSME is along the ridge on the west side of the stand. The worst mistletoe in PIPO lies along that same ridge but to the north. Mistletoe incidence is light and scattered throughout the rest of the stand.

Management Recommendations: Defer treatment in the east 2/3 of the stand. HOR in the west 1/3, removing the mistletoe-infected PIPO overstory sawtimber. HSA the understory, blending poletimber to sawtimber PIPO and PSME. Leave tree DMR < 3, lower 1/3 of crowns.

STAND NUMBER - Blue Divide 259

Current Stand Description: 2-storied.

Overstory: Scattered sawtimber to mature sawtimber PIPO, PSME with scattered ABGR.

Understory: Poletimber to immature sawtimber PIPO, PSME, and ABGR.

Insect and Disease Summary: Mistletoe severity is moderate in PSME and low in PIPO. Annosus root disease incidence and severity are low in ABGR.

Management Recommendations: Defer entry 10-15 years. Thereafter HTH; leave tree DMR = 0. Discriminate against ABGR at the time of the intermediate entry.

STAND NUMBER - Blue Divide 261

Current Stand Description: 2-storied.

Overstory: Sawtimber to mature sawtimber PIPO, PSME.

Understory: Poletimber to immature sawtimber PIPO and PSME, with scattered ABGR. PIPO dominates the understory in the southern 1/2 of the stand, PSME dominates the understory in the northern 1/2. The northern 1/2 has not been entered; the southern 1/2 has been partial cut at least once.

Insect and Disease Summary: Mistletoe is severe in the overstory PSME; much of the understory PSME is also infected. Mistletoe severity is moderate in the overstory PIPO and damage is localized. Laminated root rot damage severity is moderate in PSME and ABGR; several small areas are quite severely damaged. Armillaria root disease severity is low in PSME and ABGR.

Management Recommendations: Divide the stand into two cutting units. In the northern 1/2, regenerate by HSH or HCR to PIPO and underplant. Dicriminate against PSME due to the laminated root rot hazard. Leave only the best PIPO seed trees, with DMR < 3. Exposed slopes will require special attention (i.e., more shelter from the overwood and perhaps a greater effort in the establishment of an acceptable stocking by underplanting). Harvest the merchantable understory and slash the remaining stems. We recommend that you do not attempt to sanitize the mistletoe-infected PSME understory. In the southern cutting unit, HSA leaving crop trees with DMR < 3, and mistletoe infections in the lower 1/3 of crowns. Favor PIPO whenever possible. Treatment priority is low in this second cutting unit and treatment is easily deferred.

STAND NUMBER - Blue Divide 262

Current Stand Description: 2-storied.

Overstory: Mature to overmature sawtimber PIPO with scattered mature PSME.

Understory: Poletimber to immature sawtimber PIPO; understory PSME is also scattered.

Insect and Disease Summary: Dwarf mistletoes are the principal pest management concern for this stand. Mistletoe severity in PIPO is moderate to high over the majority of the stand; severity in PSME ranges from low to moderate, and infection centers are few and scattered.

Management Recommendations: Two recent partial cut entries have taken most of the desirable PIPO and PSME sawtimber, leaving a higher proportion of inferior mistletoe-infected trees, an unacceptably low stocking, and few management options. In spite of the mistletoe hazard, we recommend that entry be deferred 20 years to increase the merchantability of the understory. Thereafter, regenerate by HSH leaving only those seedtrees with the most vigorous crowns and lowest individual tree DMR's. Feature a mix of PIPO and PSME. Underplant immediately and remove the overwood within 5 years. The terrain is steep over much of the stand and a higher than normal seedtree basal area may be warranted to provide adequate shelter. The southwestern 1/4 of the stand is adequately stocked PIPO and PSME poletimber; you may wish to delimit a separate cutting unit.

STAND NUMBER - Blue Divide 263

Current Stand Description: 2-storied.

Overstory: Scattered mature sawtimber PIPO with PSME.

Understory: Poletimber to immature sawtimber PSME with PIPO and a few scattered ABGR.

Insect and Disease Summary: Mistletoe incidence and severity are moderate in PSME and low in PIPO. Most of the mistletoe in PIPO occurs in mature overstory trees, while that in PSME occurs in poletimber in the south end of the stand.

Management Recommendations: HOR, removing all mature sawtimber, especially mistletoe-infected PIPO. HSA the understory. Leave tree DMR < 3, lower 1/3 of crowns. Discriminate against ABGR when mistletoe-free PIPO or PSME are available, otherwise leave ABGR. With proper management, serious future losses to dwarf mistletoe are easily avoided.

STAND NUMBER - Blue Divide 264

Current Stand Description: 3-storied.

Overstory: Scattered mature sawtimber PIPO.

Understory: Immature sawtimber to sawtimber PSME and ABGR with LAOC. Poletimber LAOC, PICO, and PSME.

Insect and Disease Summary: Mistletoe incidence and severity are low in PSME and LAOC. Armillaria root disease damage severity is moderate in ABGR, and low in PSME and PIPO. Annosus root disease severity is moderate in ABGR.

Management Recommendations: HOR, removing the scattered residual sawtimber to mature sawtimber PIPO and PSME. HTH the understory from below, featuring a mix of PSME, LAOC and PICO. PSME and LAOC leave tree DMR < 3, lower 1/3 of crowns. Consider a shortened rotation to avoid more significant losses to root disease. Regenerate in 30-40 years by HSH featuring a mix of LAOC, PSME, and PIPO. Underplant as needed. Most of the root disease is north and east of the 9738613 Road in Section 16.

STAND NUMBER - Blue Divide 265

Current Stand Description: 3-storied.

Overstory: Scattered mature sawtimber PIPO, with PSME and ABGR, and few LAOC.

Understory: Sawtimber PIPO and PSME. Poletimber to immature sawtimber PSME, ABGR, PIPO and LAOC.

Insect and Disease Summary: Mistletoe severity is moderate in PIPO, PSME, and LAOC. Most of the mistletoe found in PIPO lies along the eastern edge of the stand. Annosus and Armillaria root disease, and laminated root rot are found in ABGR, damage severity is low. Armillaria root disease and laminated root rot are also found in PSME, where damage severity is again low.

Management Recommendations: HTH featuring a blend of immature sawtimber to sawtimber PIPO, PSME, and LAOC. Leave tree DMR < 3, lower 1/3 of crowns. Avoid leaving ABGR and PSME crop trees in root disease centers and in buffers equivalent to two normal tree spacings.

STAND NUMBER - Blue Divide 266

Current Stand Description: All age and size classes are represented.

Overstory: Scattered mature sawtimber PIPO.

Understory: Poletimber to immature sawtimber PIPO, PSME, LAOC and ABGR with scattered PICO. Seedling and sapling ABGR, PICO and PIPO.

Insect and Disease Summary: Armillaria root disease incidence is variable across the stand; root disease severity is moderate in ABGR, PSME, and PIPO in the southern 1/2 of the stand and low in ABGR and PSME in the northern 1/2. Armillaria root disease is crossing from ABGR to PSME to PIPO in the same infection centers. Mistletoe severity is moderate in PIPO, and ranges from moderate to high in PSME. Blister rust hazard is low.

Management Recommendations: HOR, removing the mature sawtimber PIPO, PSME, and ABGR, especially the mature sawtimber PIPO at the north edge of the stand. HTH the understory from below, discriminating against ABGR whenever suitable PIPO or PSME are available. Feature a 2:1 mix of PIPO, PSME. The resulting stand will be a blend of larger poletimber to immature sawtimber with some sawtimber; leave tree DMR < 3, lower 1/3 of crowns. A creek runs through the western portion of the stand which borders the 9738613 Road. This is a much wetter ABGR/LIBO (grand fir/twinflower) habitat type and should be handled as a separate cutting unit. You may wish to manage ABGR in this area.

STAND NUMBER - Blue Divide 267

Current Stand Description: All age and size classes are represented.

Overstory: Mature to overmature sawtimber PIPO with scattered mature sawtimber PSME and ABGR.

Understory: Immature sawtimber to sawtimber PSME, ABGR, with LAOC. Poletimber PSME, ABGR, and PICO.

Insect and Disease Summary: Mistletoe damage severity is high in PIPO and PSME, and moderate in LAOC. Laminated root rot and Armillaria root disease severities are low in both PSME and ABGR. Blister rust hazard is high.

Management Recommendations: This stand is very large and it would be prudent to delimit several different cutting units, treating some and deferring treatment in others. The worst dwarf mistletoe is found in the center 1/3 of the stand in the area adjacent to the junction of the 9738118 and 9738609 Roads. Some of the worst laminated root rot and Armillaria root disease in PSME and ABGR is found in the northeastern 1/4 of the stand. These areas have the highest treatment priority. To manage PIPO, PSME, and LAOC, we recommend a HSH without delay. Seedtree DMR < 3, lower 1/3 of crowns. Underplant PIPO, PSME and LAOC; HFR within 5 years. Avoid planting PSME in root disease infection centers and within a 50-foot buffer around them. Discriminate against PSME and ABGR ingrowth within infection centers, including adequate buffers. Eventually the entire stand should be regenerated to PIPO or a mix of PIPO and PSME. Laminated root rot and Armillaria root disease are present on the site and will increase dramatically if the normal succession to PSME and ABGR is allowed.

STAND NUMBER - Blue Divide 268

Current Stand Description: All age and size classes are represented.

Overstory: Mature sawtimber to overmature sawtimber PIPO with ABGR and PSME.

Understory: Immature sawtimber to sawtimber PSME, ABGR. Poletimber ABGR and seedling and sapling PIPO and ABGR.

Insect and Disease Summary: Mistletoe severity is moderate in PIPO and PSME overstory. Armillaria root disease severity is low in ABGR.

Management Recommendations: The stand is succeeding to ABGR, PSME. HSH to PIPO, PSME, removing all overstory ABGR. Seedtree DMR < 3, lower 1/3 of crowns. Do not attempt to sanitize the understory. Remove the merchantable material and slash the residual understory. Underplant PIPO and PSME as needed, HFR within 5 years.

STAND NUMBER - Blue Divide 272

Current Stand Description: Single story.

Overstory: Poletimber to immature sawtimber ABGR, PSME, PIPO, and LAOC.

Insect and Disease Summary: Annosus and Armillaria root disease, and laminated root rot are all present in ABGR, but damage severity is low for each. Mistletoe incidence in PSME is very low.

Management Recommendations: Following an HOR, the stand has undergone a conversion to ABGR. We recommend no treatment at this time. Consider managing the current stand on a shortened rotation. Eventually regenerate to the former stand condition which was PSME, PIPO, and LAOC.

STAND NUMBER - Blue Divide 273

Current Stand Description: 2-storied.

Overstory: Poletimber to immature sawtimber ABGR with a few scattered LAOC.

Understory: Seedling and sapling ABGR.

Insect and Disease Summary: Mistletoe incidence in PSME is very low. Annosus root disease is present at low levels in ABGR.

Management Recommendations: Defer entry for 20 years. Thereafter, HTH treating all ABGR stumps with Borax immediately after felling. Eventually regenerate to the former condition (i.e., PIPO, PSME).

STAND NUMBER - Blue Divide 274

Current Stand Description: 2-storied.

Overstory: Poletimber to immature sawtimber ABGR, PSME, and scattered PIPO and LAOC. Mature PIPO and PSME overstory removed in two recent partial cuts.

Understory: Seedling and sapling ABGR, PSME with a few scattered PIPO.

Insect and Disease Summary: Mistletoe incidence in PSME is low, as is the incidence of Annosus root disease in ABGR.

Management Recommendations: HTH from below. Feature PIPO and best PSME and ABGR. Remove mistletoe-infected PSME (i.e., leave tree DMR = 0). Consider regeneration to PIPO, PSME by HCC or HSH within 30-40 years.

STAND NUMBER - Blue Divide 275

Current Stand Description: 2-storied.

Overstory: Mature sawtimber to overmature sawtimber PSME, PIPO.

Understory: Immature sawtimber to sawtimber PSME, PIPO, LAOC, ABGR.

Insect and Disease Summary: Mistletoe severity is moderate in PSME, and blister rust hazard is high.

Management Recommendations: The stand should be divided into three separate cutting units. The first unit consists of immature sawtimber to sawtimber PSME, PIPO, and ABGR in the southwest 1/3 of the stand. The second unit consists of the same species and size classes but is located in the northeast 1/4 of the stand. For these first two units we recommend a HOR of the mature and overmature sawtimber PIPO and PSME. The removal cut can be unit designated with a specified diameter limit of 20 or 22 inches DBH. HSA the understory from below, leave tree DMR < 3, lower 1/3 of crowns. The third cutting unit lies in the middle section of the stand along a northwest-southeast line on either side of the drainage. This unit is primarily sapling and poletimber PIPO, PSME, LAOC, and ABGR. Entry into this unit can be delayed 10-15 years. Thereafter, HTH from below featuring a mix of PIPO, PSME, and LAOC. If the stand cannot be entered in 10-15 years, SPC the unit now.

STAND NUMBER - Blue Divide 276

Current Stand Description: All age and size classes are represented.

Overstory: Mature to overmature sawtimber PIPO, PSME with scattered ABGR.

Understory: Poletimber to immature sawtimber PSME, PIPO, ABGR. Seedling and sapling ABGR.

Insect and Disease Summary: Dwarf mistletoe severity in PSME is moderate.

Management Recommendations: HOR the mature and overmature sawtimber PIPO and PSME. HTH the understory from below. Leave tree DMR < 3, lower 1/3 of crowns. In the southwestern 1/2, the residual stand will consist of PSME and ABGR, while in the northeastern 1/2, the residual stand will be primarily PIPO with PSME. Silvicultural treatment priority is high, pest management treatment priority is low.

STAND NUMBER - Blue Divide 277

Current Stand Description: 2-storied.

Overstory: Sawtimber to mature sawtimber ABGR, PSME, ABLA, and LAOC.

Understory: Poletimber to immature sawtimber ABGR, ABLA, PSME, and PICO.

Insect and Disease Summary: Mistletoe severity in LAOC ranges from moderate to high but is moderate overall; mistletoe severity in PSME is low. Laminated root rot damage severity is low in ABLA and moderate in PSME and ABGR. The incidence and severity of Armillaria and Annosus root diseases in ABGR is low. Blister rust hazard is moderate.

Management Recommendations: Divide the stand into two cutting units. The first unit consists of ABGR, ABLA, and PSME and roughly comprises the whole western 1/2 of the current stand. The second unit consists of PSME, ABGR, and LAOC, accounting for the remainder of the stand. HTH from below the first unit, leave tree DMR = 0. Regenerate in 30-40 years by HCC. Plant laminated root rot infection centers with adequate buffers to LAOC and PICO. Dicriminate against ABLA, ABGR, and PSME ingrowth in laminated root rot infection centers for at least 50 years. Plant the remainder of the unit to LAOC and PSME. HTH from below in the second cutting unit as well, removing mistletoe infected LAOC; leave tree DMR < 3, lower 1/3 of crowns. Feature a mix of the best PSME and LAOC. Regenerate within 20-30 years by HSH. Underplant LAOC and PSME; HFR within 5 years.

STAND NUMBER - Blue Divide 278

Current Stand Description: 2-storied.

Overstory: Scattered mature and overmature sawtimber PSME, LAOC, and ABGR.

Understory: Poletimber and immature sawtimber ABGR, ABLA, with a few scattered LAOC.

Insect and Disease Summary: LAOC mistletoe severity is moderate; PSME mistletoe severity is low. Laminated root rot damage severity is low in PSME and ABGR. Blister rust hazard is low.

Management Recommendations: Defer treatment 10-15 years. Thereafter, HOR the scattered mature and overmature overstory PSME and LAOC and HTH the understory. LAOC leave tree DMR < 3, lower 1/3 of crowns, PSME leave tree DMR = 0.

STAND NUMBER - Blue Divide 279

Current Stand Description: 2-storied.

Overstory: Few mature sawtimber LAOC and PSME. Most of the larger sawtimber is near the bottom of the unit.

Understory: Immature sawtimber to sawtimber ABGR, PSME, LAOC, with some ABLA near the top of the unit.

Insect and Disease Summary: Pest management concerns are of minor importance at the present time.

Management Recommendations: Defer entry 20-30 years. Thereafter, HTH and remove the scattered overstory (HOR).

STAND NUMBER - Blue Divide 280

Current Stand Description: Single story.

Overstory: Overmature sawtimber ABGR with a few scattered PSME and LAOC.

Understory: Minor component of poletimber to immature sawtimber ABGR, PSME, and LAOC.

Insect and Disease Summary: Laminated root rot incidence and severity are moderate in ABGR and PSME and low in LAOC. Annosus root disease damage severity is low in ABGR.

Management Recommendations: The slope is very unstable and may be unsuitable for commercial timber production. We recommend that the soils be examined by a soil specialist. If the stand is managed, we recommend regeneration by HCC. No other regeneration methods are suited to the current pest management situation. If regenerated, the stand should be planted to LAOC, PSME, and PIMO genotypes with demonstrated resistance to blister rust. Avoid planting PSME in root rot infection centers and within a 50 foot buffer around them. Discriminate against PSME and ABGR ingrowth within infection centers including adequate buffers.

STAND NUMBER - Blue Divide 281

Current Stand Description: 2-storied.

Overstory: Sawtimber to mature sawtimber PSME, ABGR, LAOC, and PIMO.

Understory: Poletimber to immature sawtimber ABGR, PSME, LAOC.

Insect and Disease Summary: Mistletoe severity is moderate in PSME. Annosus root disease severity is moderate in ABGR. Laminated root rot severity is low in ABGR, as is Armillaria root disease. Nearly all sawtimber PIMO have been killed by mountain pine beetle.

Management Recommendations: Regenerate by HCC. Plant PSME, PIMO, LAOC. A delay of 10-20 years to increase the merchantability of the understory is acceptable.

STAND NUMBER - Blue Divide 282

Current Stand Description: Single story.

Overstory: Mature to overmature sawtimber ABGR, PSME, with scattered LAOC, PIMO, and PIPO.

Understory: Suppressed sapling and poletimber ABGR.

Insect and Disease Summary: Mistletoe incidence and severity are moderate in PSME and LAOC. Annosus root disease severity is moderate in ABGR; laminated root rot severity is low in PSME. Most all sawtimber PIMO have been killed by mountain pine beetle.

Management Recommendations: This old-growth stand should be regenerated if it is to be entered. Regenerate by HCC, planting back to PSME, PIMO, and LAOC. Entry is easily deferred 10-15 years. Discriminate against ABGR ingrowth in root rot centers and buffers with frequent use of prescribed fire. Avoid planting PSME in root rot centers.

STAND NUMBER - Blue Divide 283

Current Stand Description: 2-storied.

Overstory: Sawtimber to mature sawtimber ABGR, ABLA, PSME, and PIMO.

Understory: Sapling to poletimber ABGR, ABLA, and PSME.

Insect and Disease Summary: Annosus root disease severity is low in ABGR and ABLA. Most of the sawtimber PIMO have been killed by mountain pine beetle.

Management Recommendations: No entry. We recommend that a soils specialist examine the site to determine its suitability for commercial timber production. Slides are common and the slope appears to be very unstable. It may be best to remove these acres from the timber base.

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